

EXAM FORMAT AND AIDS PERMITTED FOR SPRING/SUMMER 2023 NATIONAL TECHNICAL SESSION

Name of Subject Basic Studies	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
04-BS-1, Mathematics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae
04-BS-2, Probability and Statistics (2hrs)	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. Note; statistical tables of the normal, t, chi-square and F distributions are provided
04-BS-3, Statics and Dynamics	2	CLOSED	Print graphing paper: https://www.egbc.ca/getmedia/6033438e-2ea2-434f-b216-2073fd83219a/Graphing-Paper.aspx Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. <u>THE AID SHEET MUST BE SUBMITTED WITH THE WRITTEN EXAM.</u> No external resources of any type are allowed to be accessed during the writing of this exam.
04-BS-4, Electric Circuits and Power	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
04-BS-5, Advanced Mathematics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
04-BS-6, Mechanics of Materials	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. Note, example problems and solutions to problems are NOT allowed. <u>THE AID SHEET MUST BE SUBMITTED WITH THE WRITTEN EXAM.</u>
04-BS-7, Mechanics of Fluids	2	CLOSED	Print diagrams in advance of the exam: https://www.egbc.ca/getmedia/e80aa7e6-bf1d-4e39-8146-8d730bc05a9d/PEO-Technical-Examinations-Required-Charts.pdf.aspx
04-BS-8, Digital Logic Circuits	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
04-BS-9, Basic Electromagnetics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
04-BS-10, Thermodynamics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
04-BS-11, Properties of Materials	2	CLOSED	NONE
04-BS-12, Organic Chemistry	2	CLOSED	NONE
04-BS-13, Biology	2	CLOSED	Print graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.

Format 1, No Calculators Permitted;

Format 2, One of two calculators is permitted - any Casio or Sharp approved model;

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04-BS-14, Geology	2	CLOSED	NONE
04-BS-15, Engineering Graphics and Design Process	1	CLOSED	NONE
04-BS-16, Discrete Mathematics	2	CLOSED	NONE

Name of Subject Complementary Studies	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
11-CS-1, Engineering Economics	3	OPEN	Candidates should bring with them compound interest factors tables
11-CS-2, Engineering in Society- Health and Safety	1	CLOSED	NONE
11-CS-3, Sustainability, Engineering and the Environment	3	OPEN	NONE
11-CS-4, Engineering Management	1	CLOSED	NONE

Name of Subject Complementary Studies (APEGA Candidate's only)	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
98-CS-1, Engineering Economics	3	OPEN	Candidates should bring with them compound interest factors tables
98-CS-2, Engineering in Society - Health, Safety, and the Environment	3	CLOSED	NONE
98-CS-3, Management Concepts for Engineers	3	CLOSED	NONE

Name of Subject Agricultural	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
04-Agric-A1, Applied Plant, Animal or Human Physiology	2	CLOSED	NONE

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04-Agric-A7, Chemistry and Microbiology of Foods examination	2	CLOSED	Print graphing paper: https://www.egbc.ca/getmedia/6033438e-2ea2-434f-b216-2073fd83219a/Graphing-Paper.aspx Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
04-Agric-B5, Power Units for Agricultural, Biosystems, and Food Industries	3	OPEN	Only textbooks and references books. No notes and solved problems.

Name of Subject Biomedical/Biochemical	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
04-Bio-A3, Cellular and Molecular Biology and Biochemistry	2	CLOSED	NONE
04-Bio-B6, Bioinstrumentation	3	OPEN	NONE

Name of Subject Building	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
07-Bld-A1, Elementary Structural Analysis	2	CLOSED	NONE
07-Bld-A4, Building Engineering Systems	2	CLOSED	NONE
07-Bld-A6, Geotechnical Materials and Analysis	2	CLOSED	NONE
07-Bld-B1, Computer Programming	2	CLOSED	NONE
07-Bld-B4, Modern Building Materials	1	CLOSED	NONE
07-Bld-B5, Fire and Smoke Control in Buildings	2	CLOSED	NONE

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Name of Subject Chemical	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
16-Chem-A1, Process Balances and Chemical Thermodynamics	3	OPEN	Print Graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx This is an open-book exam. One textbook of your choice with notations listed on the margins etc. are permitted for each section/part, but no loose notes are permitted into the exam.
16-Chem-A2, Unit Operations and Separation Processes	3	OPEN	Print Graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx Candidates can bring ONE textbook of their choice. The textbook can have notations listed on the margins but no loose notes are permitted.
16-Chem-A3, Heat and Mass Transfer	3	OPEN	Print graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx One textbook of choice with notations listed on the margins but no loose notes are permitted.
16-Chem-A4, Chemical Reactor Engineering	3	OPEN	Print Graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx Candidates can bring ONE textbook of their choice. The textbook can have notations listed on the margins but no loose notes/or solved problems are permitted. Candidates should have unit conversion tables and/or mathematical tables such as a CRC handbook.
16-Chem-A5, Chemical Plant Design and Economics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Chem-A6, Process Dynamics & Control	3	OPEN	NONE
16-Chem-B1, Transport Phenomena	3	OPEN	This is an open-book exam. One textbook of your choice with notations listed on the margins etc. are permitted for each section/part, but no loose notes are permitted into the exam.
16-Chem-B2, Environmental Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Chem-B6, Petroleum Refining and Petrochemicals	3	OPEN	NONE
16-Chem-B8, Polymer Engineering	3	OPEN	NONE Print graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx

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16-Chem-B10, Life Cycle Assessment (LCA)	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
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Name of Subject Civil	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
16-Civ-A1, Elementary Structural Analysis	2	CLOSED	NONE
16-Civ-A2, Elementary Structural Design	2	CLOSED	Handbooks and textbooks are permitted. <u>NO notes or loose sheets are allowed.</u> Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book. Note: The solutions for Standards of Steel, Concrete & Timber must come from the latest manual editions.
16-Civ-A3, Municipal and Environmental Engineering	3	OPEN	NONE
16-Civ-A3, Elementary Environmental Engineering (National Only)	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Civ-A4, Geotechnical Materials and Analysis	2	CLOSE	NONE
16-Civ-A5, Hydraulic Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Civ-A6, Highway Design, Construction and Maintenance	2	CLOSED	NONE
16-Civ-B1, Advanced Structural Analysis	2	CLOSED	NONE
16-Civ-B2, Advanced Structural Design	2	CLOSED	Design handbooks and textbooks are permitted. <u>NO notes or loose sheets are allowed.</u> Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.
16-Civ-B3, Geotechnical Design	3	OPEN	It is to the candidate's advantage to bring the Canadian Foundation Manual.
16-Civ-B4, Engineering Hydrology	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Civ-B5, Water Supply & Wastewater Treatment	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Civ-B7, Transportation Planning and Engineering	2	CLOSED	No solved questions from a textbook or any other source, such as the Internet. All responses must be written in your own words. No external resources of any type are allowed to be accessed during the writing of this exam.

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16-Civ-B8, Management of Construction	2	CLOSED	NONE
16-Civ-B9, The Finite Element Method	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Civ-B10, Traffic Engineering	3	OPEN	NONE
16-Civ-B11, Structural Materials	2	CLOSED	Print Graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing Formulas Only
16-Civ-B12, Risk & Safety in Civil Engineering	3	OPEN	NONE Print graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx

Name of Subject Computer	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
17-Comp-A1, Electronics	3	OPEN	NONE
17-Comp-A2, Digital Systems Design	2	CLOSED	NONE
17-Comp-A3, Computer Architecture	3	OPEN	NONE
17-Comp-A5, Operating Systems	2	CLOSED	NONE
17-Comp-B5, Computer Communications	2	CLOSED	NONE
17-Comp-B10, Distributed Systems	2	CLOSED	NONE
17-Comp-B12, Computer Security	2	CLOSED	NONE

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Name of Subject Electrical	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
16-Elec-A1, Circuits	2	CLOSED	NONE
16-Elec-A2, Systems and Control	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Elec-A3, Signals and Communications	2	CLOSED	NONE
16-Elec-A4, Digital Systems and Computers	2	CLOSED	NONE
16-Elec-A5, Electronics	2	CLOSED	NONE
16-Elec-A6, Power Systems and Machines	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. <u>No worked out solutions are allowed on this sheet.</u>
16-Elec-A7, Electromagnetics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. <u>No worked out solutions are allowed on this sheet.</u>
16-Elec-B1, Digital Signal Processing	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing tables & formulas written both sides. No textbook excerpts or examples solved.
16-Elec-B2, Advanced Control Systems	2	OPEN	NONE
16-Elec-B3, Digital Communications Systems	2	CLOSED	NONE
16-Elec-B4, Information Technology Networks	2	CLOSED	NONE
16-Elec-B5, Advanced Electronics	2	CLOSED	NONE
16-Elec-B6, Integrated Circuit Engineering	2	CLOSED	NONE
16-Elec-B7, Power Systems Engineering	3	OPEN	ONE Power System textbook and any course notes permitted. No other sources, such as the internet.

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16-Elec-B8, Power Electronics and Drives	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. <u>No worked out solutions are allowed on this sheet.</u>
16-Elec-B9, Electromagnetic Field, Transmission Lines, Antennas, and Radiation	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Elec-B10, Electro-Optical Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.

Name of Subject	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
Environmental			
18-Env-A2, Hydrology and Municipal Hydraulics Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Env-A3, Geotechnical and Hydrogeological Engineering	3	OPEN	NONE
18-Env-A4, Water and Wastewater Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Env-A5, Air Quality and Pollution Control Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Env-A6, Solid Waste Engineering & Management	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Env-B2, Water Resources	3	OPEN	NONE
18-Env-B4, Site Assessment and Remediation	3	OPEN	NONE
18-Env-B5, Industrial and Hazardous Waste Management	3	OPEN	NONE

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Name of Subject Geological	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
18-Geol-A1, Mineralogy and Petrology	1	CLOSED	NONE
18-Geol-A3, Sedimentation and Stratigraphy	1	CLOSED	NONE
18-Geol-A4, Structural Geology	2	CLOSED	Protractor, drawing compass and ruler are permitted.
18-Geol-A5, Rock Mechanics	2	CLOSED	Print graphing paper: https://www.egbc.ca/getmedia/6033438e-2ea2-434f-b216-2073fd83219a/Graphing-Paper.aspx Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Geol-A6, Soil Mechanics	2	CLOSED	Compass and ruler required. Print graphing paper: https://www.egbc.ca/getmedia/6033438e-2ea2-434f-b216-2073fd83219a/Graphing-Paper.aspx
18-Geol-B1, Contaminant Hydrogeology	3	OPEN	NONE
18-Geol-B4, Geomorphology and Pleistocene Geology	1	CLOSED	NONE
18-Geol-B3, Site Investigation	3	OPEN	NONE
18-Geol-B6-1, Resource Geology-Petroleum Deposit	1	CLOSED	NONE
18-Geol-B10-2, Electrical Methods	2	CLOSED	NONE

Name of Subject Geomatics	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
18-Geom-A1, Surveying	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Geom-A2, Adjustment of Observations and Data Analysis	2	CLOSED	NONE
18-Geom-A5, Remote Sensing and Image Analysis	2	CLOSED	NONE
18-Geom-A6, Cadastral Studies	1	CLOSED	NONE

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18-Geom-B3, Networks and Precise Engineering Surveys	2	CLOSED	NONE
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Name of Subject Industrial	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
17-Ind-A1, Operations Research	3	OPEN	NONE
17-Ind-A2, Analysis and Design of Work	2	CLOSED	NONE
17-Ind-A3, Facilities Planning	2	CLOSED	NONE
17-Ind-A4, Production Management	2	CLOSED	NONE
17-Ind-A5, Quality Planning, Control, and Assurance	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
17-Ind-A6, Systems Simulation	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
17-Ind-B1, Applied Probability and Statistics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
17-Ind-B2, Manufacturing Processes	2	CLOSED	NONE
17-Ind-B7, Financial and Managerial Accounting	2	CLOSED	NONE
17-Ind-B10, Workplace Health and Safety	1	CLOSED	NONE

Name of Subject Marine	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
98-Mar-A1, Applied Thermodynamics and Heat Transfer	3	OPEN	Candidates are expected to have copies of both a thermodynamics text AND a heat transfer text in order to make use of the information presented in the tables and graphs. Candidates may consult any textbook but no previous examination solution or solved problems. Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.
98-Mar A2, Fundamentals of Naval Architecture	3	OPEN	NONE

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98-Mar-A5, Advanced Strength of Materials	2	OPEN	NONE
98-Mar-A7, Marine Engineering	2	CLOSED	NONE
98-Mar-B5, Fluid Machinery	2	CLOSED	Drawing instruments (scale ruler, protractor and sharp pencil) are required for vector diagrams.

Name of Subject Mechanical	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
16-Mec-A1, Applied Thermodynamics and Heat Transfer	3	OPEN	Candidates are expected to have copies of both a thermodynamics text AND a heat transfer text in order to make use of the information presented in the tables and graphs. Candidates may consult any textbook but no previous examination solution or solved problems. Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.
16-Mec-A2, Kinematics and Dynamics of Machines	2	OPEN	NONE
16-Mec-A3, System Analysis and Control	2	CLOSED	NONE Print graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx
16-Mec-A4, Design and Manufacture of Machine Elements	3	OPEN	NONE
16-Mec-A5, Electrical and Electronics Engineering	2	CLOSED	NONE
16-Mec-A6, Advanced Fluid Mechanics (PEO Candidate only) Mec-B6 code for Nationals	2	OPEN	NONE
16-Mec-A7, Advanced Strength of Materials	2	OPEN	NONE
16-Mec-B1, Advanced Machine Design	3	OPEN	NONE
16-Mec-B2, Environmental Control in Buildings	2	CLOSE	Drawing instruments required (scale ruler, set square, sharp pencil) No other aids are permitted. Print charts and diagrams in advance of exam: https://www.egbc.ca/getmedia/e80aa7e6-bf1d-4e39-8146-8d730bc05a9d/PEO-Technical-Examinations-Required-Charts.pdf.aspx
16-Mec-B3, Energy Conversion and Power Generation	2	CLOSED	Drawing instruments (scale ruler) Print chart in advance of exam: https://www.egbc.ca/getmedia/e80aa7e6-bf1d-4e39-8146-8d730bc05a9d/PEO-Technical-Examinations-Required-Charts.pdf.aspx

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16-Mec-B4, Integrated Manufacturing Systems	3	OPEN	NONE
16-Mec-B5, Product Design and Development	2	OPEN	NONE
16-Mec-B6, Fluid Machinery (PEO Candidate only) Mec-A6 code for Nationals	2	CLOSED	Drawing instruments (scale ruler, protractor and sharp pencil) are required for vector diagrams.
16-Mec-B7, Aero and Space Flight	3	OPEN	NONE
16-Mec-B8, Engineering Materials	2	OPEN	NONE
16-Mec-B9, Advanced Engineering Structures	2	OPEN	NONE
16-Mec-B10, Finite Element Analysis	3	OPEN	NONE
16-Mec-B12, Robot Mechanics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. No worked out solutions of examples and must be handed in with exam.

Name of Subject Metallurgical	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
10-Met-A2, Metallurgical Rate Phenomena	2	OPEN	NONE
10-Met-A3, Metal Extraction Processes	2	CLOSED	NONE
10-Met-A5, Mechanical Behaviour of Materials	2	CLOSED	NONE
10 - Met-A6, Thermal Treatment of Metals and Alloys	2	CLOSED	NONE
10-Met-A7, Corrosion and Oxidation	3	OPEN	NONE
10-Met-B5, Metal Fabrication	2	CLOSED	NONE
10-Met-B6, Physical Metallurgy of Iron and Steel	2	CLOSED	NONE

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Name of Subject Mechatronics	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
16-Mex-A1, System Analysis and Control	2	CLOSED	NONE
16-Mex-A2, Circuits and Electronics	2	CLOSED	NONE
16-Mex-A3, Digital Systems Computers	2	CLOSED	NONE
16-Mex-A4, Applied Thermodynamics and Heat Transfer	3	OPEN	Candidates are expected to have copies of both a thermodynamics text AND a heat transfer text in order to make use of the information presented in the tables and graphs. Candidates may consult any textbook but no previous examination solution or solved problems. Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.
16- Mex-A6, Systems Analysis and Simulation	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Mex-B3, Advanced Control Systems	2	OPEN	NONE
16-Mex-B5, Robot Mechanics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. No worked out solutions of examples and must be handed in with exam.
16-Mex-B8, Product Design and Development	2	OPEN	NONE
16-Mex-B10, Power Systems and Machines	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. <u>No worked out solutions are allowed on this sheet.</u>

Name of Subject Manufacturing	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
08-Mfg-A1, Design and Manufacture of Machine Elements	3	OPEN	NONE

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08-Mfg-A3, Production Management	2	CLOSED	NONE
08-Mfg-A4, Analysis and Design of Work	2	CLOSED	NONE
08-Mfg-A5, Facilities Planning	2	CLOSED	NONE
08-Mfg-A6, Quality Planning, Control and Assurance	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
08-Mfg-B3, System Simulation	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
08-Mfg-B4, Product Design and Development	2	OPEN	NONE
08-Mfg-B5, Engineering Materials	2	OPEN	NONE
08-Mfg-B6, Metrology	3	OPEN	NONE
08-Mfg-B8, Robot Mechanics	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. No worked out solutions of examples and must be handed in with exam.
08-Mfg-B9, Workplace Health and Safety	1	CLOSED	NONE
08-Mfg-B10, Tooling, Jigs and Fixture Design	3	OPEN	NONE
08-Mfg-B11, Fluid Machinery (Mec-A6 national)	2	CLOSED	Drawing instruments (scale ruler, protractor and sharp pencil) are required for vector diagrams.

Name of Subject	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
Mining and Mineral Processing			
18-MMP-A2, Underground Mining Methods and Design	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Mmp-A6, Mining and the Environment	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
18-Mmp-B1, Applied Rock Mechanics	3	OPEN	NONE

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18-Mmp-B9, Rock Slope Engineering	3	OPEN	NONE Print graphing paper: https://www.egbc.ca/getmedia/6033438e-2ea2-434f-b216-2073fd83219a/Graphing-Paper.aspx
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Name of Subject Materials	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
12-Mtl-A1, Materials Thermodynamics	3	OPEN	Print graphing paper: https://www.egbc.ca/getmedia/fb0f9dbb-857f-477b-8340-9caedef120d5/Graphing-Paper-Semi-logarithmic.pdf.aspx One textbook of your choice with notations listed on the margins etc., but no loose notes are permitted.
12-Mtl-A2, Transport Phenomena in Materials Engineering	3	OPEN	One textbook of your choice with notations listed on the margins etc. are permitted for each section/part, but no loose notes are permitted into the exam
12-Mtl-A3, Structure and Characterization of Materials	3	OPEN	NONE
12-Mtl-A4, Mechanical Behaviour of Materials	2	CLOSED	NONE
12-Mtl-A5, Phase Transformations of Metals, Glasses, and Ceramics	2	CLOSED	NONE
12-Mtl-A6, Thermal Treatment of Metals, Glasses, Ceramics	2	CLOSED	NONE
12-Mtl-B6, Physical Metallurgy of Iron and Steel	2	CLOSED	NONE
12-Mtl-B11, Corrosion and Oxidation	3	OPEN	NONE

Name of Subject Naval	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
16-Nav-A3, Hydrodynamics of Ships (II): Ship Motion	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
16-Nav-B1, Applied Thermodynamics & Heat Transfer	3	OPEN	Candidates are expected to have copies of both a thermodynamics text AND a heat transfer text in order to make use of the information presented in the tables and graphs. Candidates may consult any textbook but no previous examination solution or solved problems. Candidates MUST write the name and model number of their calculator on the inside front cover of

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16-Nav-B2, Marine Engineering	2	CLOSED	the exam book. NONE
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Name of Subject Nuclear	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
08-Nuc-A1, Introduction to Nuclear Physics and Nuclear Engineering	2	OPEN	NONE
08-Nuc-A6, Nuclear Power Plant Systems & Operation	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
08-Nuc-B8, Applied Thermodynamics and Heat Transfer	3	OPEN	Candidates are expected to have copies of both a thermodynamics text AND a heat transfer text in order to make use of the information presented in the tables and graphs. Candidates may consult any textbook but no previous examination solution or solved problems. Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.

Name of Subject Petroleum	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
17-Pet-A1, Principles of Stratigraphy and Sedimentation	1	CLOSED	NONE
17-Pet-A3, Fundamental Reservoir Engineering	2	CLOSED	NONE
17-Pet-A4, Oil and Gas Well Drilling and Completion	3	OPEN	NONE
17-Pet-A7, Secondary and Enhanced Recovery	3	OPEN	NONE
17-Pet-B3, Oil and Gas Evaluation and Economics	2	CLOSED	NONE
17-Pet-B5, Well Testing	2	CLOSED	NONE

Name of Subject Engineering Physics	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
17-Phys-A4, Quantum Mechanics	2	CLOSED	NONE

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17-Phys-A5-A, Electronic Materials and Devices	2	CLOSED	NONE
17-Phys-A5-B, Analog and Digital Electronic Circuits	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae. <u>No worked out solutions are allowed on this sheet.</u>
17-Phys-A6, Solid State Physics	2	CLOSED	NONE
17-Phys-A7, Optics	2	CLOSED	NONE
17-Phys-B3, Digital Systems and Computers	2	CLOSED	NONE
17-Phys-B5, Systems and Control	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
17-Phys-B6, Applied Thermodynamics and Heat Transfer	3	OPEN	Candidates are expected to have copies of both a thermodynamics text AND a heat transfer text in order to make use of the information presented in the tables and graphs. Candidates may consult any textbook but no previous examination solution or solved problems. Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.

Name of Subject Preliminary Studies	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
20-Prelim-3, Physics	3	OPEN	You may bring any type of calculator, textbook and reference materials.
20-Prelim-4, Chemistry	3	CLOSED	You may bring a programmable calculator. Data sheets will be provided

Name of Subject Software	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
19-Soft-A4, Real Time Systems	2	CLOSED	NONE
19-Soft-A5, Requirements and Specifications	1	OPEN	NONE
19-Soft-A6, Software Quality Assurance	3	OPEN	NONE
19-Soft-A7, Software Development Process	2	CLOSED	Candidates are allowed to bring TWO aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae but no worked out solutions.
19-Soft-B15, Artificial Intelligence	1	CLOSED	NONE

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Name of Subject Structural	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
07-Str-A1, Elementary Structural Analysis	2	CLOSED	NONE
07-Str-A2, Elementary Structural Design	2	CLOSED	Handbooks and textbooks are permitted. <u>NO notes or loose sheets are allowed.</u> Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book. Note: The solutions for Standards of Steel, Concrete & Timber must come from the latest manual editions.
07-Str-A3, Geotechnical Materials and Analysis	2	CLOSED	NONE
07-Str-A4, Advanced Structural Analysis	2	CLOSED	NONE
07-Str-A5, Advanced Structural Design	2	CLOSED	Design handbooks and textbooks are permitted. <u>NO notes or loose sheets are allowed.</u> Candidates MUST write the name and model number of their calculator on the inside front cover of the exam book.
07-Str-A6-1, Applications of Finite Elements	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
07-Str-B1, Geotechnical Design	3	OPEN	It is to the candidate's advantage to bring the Canadian Foundation Manual.
07-Str-B2, Management of Construction	2	CLOSED	NONE
07-Str-B11, Hydraulic Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.

Name of Subject Transportation	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
07-Tra-A6, Geotechnical Materials and Analysis	2	CLOSED	NONE

Name of Subject Water Resources	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
07-Wrse-A2, Engineering Hydrology	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.

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07-Wrse-A3, Soil Mechanics & Groundwater	3	OPEN	NONE
07-Wrse-A4, Hydraulic Engineering	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
07-WRSE-A5, Water Resources Planning & Systems	3	OPEN	NONE
07-Wrse-A6, Municipal and Environmental Engineering (PEO only)	3	OPEN	NONE
07-Wrse-B3, Water Supply & Wastewater Treatment	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.
07-Wrse-B9, Modelling of Surface Water Quality need to search for an examiner	2	CLOSED	Candidates are allowed to bring ONE aid sheet 8.5" X 11" hand-written on both sides containing notes and formulae.

Name of Subject Geoscience and Geophysics	Format 1,2, or 3	Closed or Open Book	Aids/Instructions to the Candidates
20-Gfund-1b, Elementary Calculus II	3	CLOSED	None
20-Gfund-2a, General Physics	3	OPEN	You may bring any type of calculator, textbook and reference materials.
20-Gfund-3a, General Chemistry	3	CLOSED	Data sheets will be provided.
20-Glgy-7, Geochemistry	3	CLOSED	None
20-Glgy-14, Economic Geology	3	CLOSED	None
20-Goph-2C-6b, Igneous Petrology	3	CLOSED	None

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